



AEROSPACE MATERIAL SPECIFICATION

AMS2451™**REV. E**Issued 1998-07
Revised 2025-12

Superseding AMS2451D

Plating, Brush,
General Requirements

RATIONALE

AMS2451E results from a Five-Year Review and update of this specification with changes to Ordering Information, Authority (see 1.4), Definitions (see 2.4), Slash Specifications (see 3.1), Stress Relief (see 3.3.1 and 3.3.1.3), Hydrogen Embrittlement Relief (see 3.4.3.1.1), Adhesion to Parts (see 3.5.1.2.1), Solution Testing Requirements (see 3.6), Quality (see 3.7.2), Acceptance Tests (see 4.2.1), Periodic Tests (see 4.2.2), when solution acceptance tests have not been performed by the solution manufacturer (see 4.3.2.1), when solution acceptance tests have been performed by the solution manufacturer (see 4.3.2.2), Corrosion Testing (see 4.3.2.3), Reports (see 4.5.2), and Notes (see 8.9).

NOTICE

ORDERING INFORMATION: The following information shall be provided to the plating processor by the purchaser.

1. Purchase order shall specify not less than the following:

- AMS2451 slash specification number and revision letter, when applicable.
- Plating thickness desired (see 3.5.1.1)
- Basis metal to be plated
- Tensile strength or hardness of the basis metal
- Pre-plate stress relief to be performed by the plating processor (time and temperature) if different from 3.3.1
- Special features, geometry, or processing present on parts that require special attention by the plating processor
- Hydrogen-embrittlement relief, when specified in the slash specification, to be performed by the plating processor (parameters or reference document) if different from 3.4.3.1
- Provisions peculiar to parts or assemblies to be repaired or overhauled
- Quantity of pieces to be plated

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Documents

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2. Parts manufacturing operations such as heat treating, forming, joining, and media finishing can affect the condition of the substrate for plating or, if performed after plating, could adversely affect the plated part. The sequencing of these types of operations should be specified by the cognizant engineering organization or the purchaser and is not controlled by this specification.
3. The parts manufacturer should ensure that the surfaces of metal parts supplied to the processor are free from blemishes, pits, tool marks, and other irregularities that will affect the quality of the finished parts (see 3.7.2).

1. SCOPE

1.1 Purpose

This specification and its supplementary slash specifications establish the requirements for electrodeposition of metals by brush plating.

1.2 Application

This process has been used typically to improve surface properties such as corrosion resistance, wear resistance, and brazeability or to repair damaged, worn, or mismachined parts, but usage is not limited to such applications. This process is particularly useful for plating localized areas on-site, especially on large parts or assemblies, and for minimizing masking.

1.3 Safety - Hazardous Materials

While the materials, methods, applications, and processes described or referenced in this specification may involve the use of hazardous materials, this specification does not address the hazards that may be involved in such use. It is the sole responsibility of the user to ensure familiarity with the safe and proper use of any hazardous materials and to take necessary precautionary measures to ensure the health and safety of all personnel involved.

1.4 Authority

The cognizant engineering organization (CEO) may impose requirements or approve allowances that supersede the requirements in this AMS.

2. APPLICABLE DOCUMENTS

The issue of the following documents in effect on the date of the purchase order forms a part of this specification to the extent specified herein. The supplier may work to a subsequent revision of a document unless a specific document issue is specified. When the referenced document has been cancelled and no superseding document has been specified, the last published issue of that document shall apply.

2.1 SAE Publications

Available from SAE International, 400 Commonwealth Drive, Warrendale, PA 15096-0001, Tel: 877-606-7323 (U.S. and Canada only) or +1 724-776-4970 (outside U.S. and Canada), www.sae.org.

AMS2451/1	Plating, Brush, Nickel, General Purpose
AMS2451/2	Plating, Brush, Nickel, Low Stress, Hard Deposit
AMS2451/3	Plating, Brush, Nickel, Low-Stress, Low-Hardness Deposit
AMS2451/4	Plating, Brush, Cadmium, Corrosion Protective, Low Hydrogen Embrittlement
AMS2451/5	Plating, Brush, Chromium, Hard Deposit, Trivalent
AMS2451/6	Plating, Brush Copper, General Purpose
AMS2451/7	Plating, Brush, Nickel, Low Stress, Medium-Hardness Deposit

AMS2451/8	Plating, Brush, Non-Cyanide Silver, General Purpose
AMS2451/9	Plating, Brush, Zinc-Nickel, Low Hydrogen Embrittlement
AMS2451/10	Plating, Brush, Tin-Zinc, Low Hydrogen Embrittlement
AMS2451/11	Plating, Brush, Cobalt
AMS2451/12	Plating, Brush, Tin
AMS2451/13	Plating, Brush, Silver
AMS2451/14	Plating, Brush, Nickel-Tungsten, Low Hydrogen Embrittlement
AMS2750	Pyrometry
AMS2759/9	Hydrogen Embrittlement Relief (Baking) of Steel Parts
AS2390	Chemical Process Test Specimen Material
AS7766	Terms Used in AMS Metals Specifications

2.2 ASTM Publications

Available from ASTM International, 100 Barr Harbor Drive, P.O. Box C700, West Conshohocken, PA 19428-2959, Tel: 610-832-9585, www.astm.org.

ASTM B117	Operating Salt Spray (Fog) Apparatus
ASTM B253	Preparation of Aluminum Alloys for Electroplating
ASTM B374	Terminology Relating to Electroplating
ASTM B487	Measurements of Metal and Oxide Coating Thickness by Microscopical Examination of a Cross Section
ASTM B499	Measurement of Coating Thicknesses by the Magnetic Method: Nonmagnetic Coatings on Magnetic Basis Metals
ASTM B504	Measurement of Thickness of Metallic Coatings by the Coulometric Method
ASTM B530	Measurement of Coating Thicknesses by the Magnetic Method: Electrodeposited Nickel Coatings on Magnetic and Nonmagnetic Substrates
ASTM B567	Measurement of Coating Thickness by the Beta Backscatter Method
ASTM B568	Measurement of Coating Thickness by X-Ray Spectrometry
ASTM B571	Qualitative Adhesion Testing of Metallic Coatings
ASTM E140	Hardness Conversion Tables for Metals Relationship Among Brinell Hardness, Vickers Hardness, Rockwell Hardness, Superficial Hardness, Knoop Hardness, Scleroscope Hardness, and Leeb Hardness
ASTM E376	Measuring Coating Thickness by Magnetic-Field or Eddy Current (Electromagnetic) Testing Methods
ASTM E384	Microindentation Hardness of Materials
ASTM F519	Mechanical Hydrogen Embrittlement Evaluation of Plating/Coating Processes and Service Environments

2.3 U.S. Government Publications

Copies of these documents are available online at <https://quicksearch.dla.mil>.

MIL-STD-865 Selective, Brush Plating, Electro-deposition

2.4 Definitions

Terms used in AMS are defined in AS7766. ASTM B374 should be utilized as a reference and referee document when areas of design definition or technical interpretation arise.

3. TECHNICAL REQUIREMENTS

3.1 Slash Specifications

The requirements for a specific brush plating shall consist of all requirements specified herein in addition to requirements specified in the applicable slash specification (see Table 1). In case of conflict between requirements of this basic specification and the applicable slash specification, requirements of the slash specification shall govern.

Table 1 - Specifications for brush plating

Specification	Description
AMS2451/1	Plating, Brush, Nickel, General Purpose
AMS2451/2	Plating, Brush, Nickel, Low Stress, Hard Deposit
AMS2451/3	Plating, Brush, Nickel, Low-Stress, Low-Hardness Deposit
AMS2451/4	Plating, Brush, Cadmium Corrosion Protective, Low Hydrogen Embrittlement
AMS2451/5	Plating, Brush, Chromium, Hard Deposit, Trivalent
AMS2451/6	Plating, Brush Copper, General Purpose
AMS2451/7	Plating, Brush, Nickel Low Stress, Medium-Hardness Deposit
AMS2451/8	Plating, Brush, Non-Cyanide Silver General Purpose
AMS2451/9	Plating, Brush, Zinc-Nickel, Low Hydrogen Embrittlement
AMS2451/10	Plating, Brush, Tin-Zinc, Low Hydrogen Embrittlement
AMS2451/11	Plating, Brush, Cobalt
AMS2451/12	Plating, Brush, Tin
AMS2451/13	Plating, Brush, Silver
AMS2451/14	Plating, Brush, Nickel-Tungsten Low Hydrogen Embrittlement

3.2 Operator Training

3.2.1 Operators performing work under this standard shall be certified as qualified operators by the quality control department of the plating facility or by the solution manufacturer/supplier. Operator training shall include plating of simulated parts and specimens, and approval shall be based on evaluation of the operator's familiarity with the brush plating equipment/solutions and the specification requirements. Certification shall be conferred on trained operators who have successfully demonstrated knowledge of the process and their ability to produce satisfactory plating per this standard through written and practical examination.

3.2.2 Parts and test specimens shall be plated by trained operators who have been approved and certified initially and then annually thereafter for plating on the basis material with the equipment and processing materials to be used (see 8.2).